

Patent Claims

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1. Lifting device (2) for containers (18), especially ISO containers (18) which can be handled by means of container handling equipment (1), with a drive means for a traction means (16), arranged on a support frame (3), for lifting and lowering the container (18) by means of a load-receiving means arranged at the lower end of the traction means (16), characterized in that
the drive means comprises at least one hydraulic cylinder (4) with a piston and a piston rod (5), whose lengthwise displacement is transformed into a synchronous upward and downward movement of at least two horizontal guiding cross-bars (10a, 10b), spaced apart from each other, each being connected to the upper ends of the traction means (16), while the guiding cross-bars (10a, 10b) are guided at both ends on vertical columns of the support frame (3).
2. Lifting device (2) per Claim 1, characterized in that the transformation of the lengthwise displacement into the upward and downward movement is accomplished by means of angle levers (7) pivoted on the support frame (3), with two lever arms (6, 8) each, wherein one lever arm (6) of one of the angle levers (7) is connected to a piston rod (5) and the other lever arm (8) of this angle lever (7) is connected to a guiding cross-bar (10a, 10b).
3. Lifting device (2) per Claim 2, characterized in that the lever arm (6) of an angle lever (7) connected to the piston rod (5) is connected by means of a rod-shaped coupling element (12) to a lever arm (13) of another angle lever (14), whose other lever arm (15) is connected to the other guiding cross-bar (10a, 10b), being linked such that the corresponding traction means (16) move synchronously to each other in the vertical direction.
4. Lifting device (2) according to one of Claims 1 to 3, characterized in that guiding cross-bars (10a, 10b) are each connected by means of a coupling rod (9a, 9b) to a lever arm (8, 15).
5. Lifting device (2) according to one of Claims 1 to 4, characterized in that the guiding cross-bars (10a, 10b) are each connected by means of a coupling rod (9a, 9b) to a lever arm (8, 15) on either side of the middle of the cross-bar.
6. Lifting device (2) per Claim 1, characterized in that the transformation of the lengthwise displacement into the upward and downward motion is accomplished by means of cables (26-29) that are deflected and fastened to a single piston rod (5), being connected at the other end at least indirectly to the guiding cross-bars (10a, 10b), wherein the deflection occurs by means of freely turning deflection rollers (30-33, 34-37).
7. Lifting device (2) per Claim 6, characterized in that the deflection of the cables (26-29) occurs in the direction vertical to the respective guiding cross-bar (10a, 10b) via a freely turning deflection roller (34-37).